

# **NOAA Technical Memorandum NMFS**



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**NOAA-TM-NMFS-SWFSC-175**

**U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Southwest Fisheries Science Center**

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# **THE HAWAIIAN MONK SEAL AND GREEN TURTLE AT PEARL AND HERMES REEF, 1988**

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### **U.S. DEPARTMENT OF COMMERCE**

Barbara H. Franklin, Secretary

### **National Oceanic and Atmospheric Administration**

John A. Knauss, Under Secretary for Oceans and Atmosphere

### **National Marine Fisheries Service**

William W. Fox, Jr., Assistant Administrator for Fisheries

## ABSTRACT

The Hawaiian monk seal, Monachus schauinslandi, and the green turtle, Chelonia mydas, were studied at Pearl and Hermes Reef in the Northwestern Hawaiian Islands from 17 May to 3 July 1988. Atoll-wide beach counts of seals excluding pups ranged from 34 to 62 animals ( $\bar{x} = 49.3$ ); counts including pups ranged from 48 to 77 seals ( $\bar{x} = 62.7$ ). Eighteen weaned pups were tagged, and four seals with broken or lost tags were retagged. Nine monk seal injuries were seen, and no entanglements or deaths noted. Seventy-six green turtles were newly tagged, and 10 green turtles tagged in previous years were resighted.

## INTRODUCTION

Pearl and Hermes Reef (lat. 27°55'N, long. 175°W) is one of eight recorded pupping and haul-out sites for the endangered Hawaiian monk seal, Monachus schauinslandi, and is also a foraging, basking, and nesting site for the threatened green turtle, Chelonia mydas. The National Marine Fisheries Service (NMFS) began ongoing population monitoring efforts on the monk seal and green sea turtle at Pearl and Hermes Reef in 1982, establishing research camps annually to study both species (Kam 1986; NMFS unpublished data<sup>1</sup>).

The primary objectives of the 1988 field season were to conduct atoll-wide seal censuses and to tag weaned pups of the year. Additional objectives were to retag seals with missing or broken tags; monitor interatoll movement, survival, injuries, and entanglements of seals; tag turtles and resight turtles tagged in previous years; and inventory and destroy debris capable of entangling seals or turtles. This report summarizes the data collected during the 1988 field season.

## MATERIALS AND METHODS

Data were collected during 17 May-3 July 1988 at Pearl and Hermes Reef, located within the Hawaiian Islands National Wildlife Refuge. The atoll contains four vegetated and three non-vegetated sand islets, some of which have smaller associated sandbars which appear and disappear seasonally (Fig. 1). The history, geology, flora, and fauna of Pearl and Hermes Reef were documented by Amerson et al. (1974).

### Individual Identification

Individual seals were identified by tags or natural markings on an opportunistic basis, and were classified by size and sex. Procedures for seal identification and size classification are described in Stone (1984). All pups were tagged with a blue, plastic Temple Tag<sup>2</sup> on each hind flipper (Gilmartin et al. 1986) after weaning. Scars and other natural markings were photographed and drawn on a scar card for each seal. The photographs were added to the individual identification files begun in 1982.

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<sup>1</sup>Southwest Fisheries Science Center Honolulu Laboratory, National Marine Fisheries Service, NOAA, 2570 Dole Street, Honolulu, HI 96822-2396.

<sup>2</sup>Reference to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.

### **Seal Censuses and Patrols**

Census protocol is outlined in Johanos and Kam (1986), and data were recorded on the standard census form (Forsyth et al. 1988), following the 1988 coding instructions in Gerrodette and Frizelle (1988). Full-atoll censuses, where all islets in the atoll were censused within a 2-day period, were conducted at 2 to 6 day intervals. North, Little North, and Southeast Islands were usually censused in 1 day, and the remaining islands were censused on the following day. If weather conditions permitted, the atoll census was conducted during a single day. In these cases, the islands in the south part of the atoll were censused first, followed by North, Little North, and Southeast Islands.

Data recorded on census forms during incidental patrols from 17 May to 3 July included sightings of identified individuals, nursing mother-pup pairs, and events not already recorded during censuses.

### **Turtle Research**

Turtle sightings during censuses were recorded on the same form used for seals. Adult turtles were captured while they were foraging or basking, tagged with a metal tag on the trailing edge of a foreflipper, and measured. Immature turtles were captured with a scoop net, tagged, measured, and marked with acrylic spray paint.

### **Collection of Samples**

All nets, lines, ropes, and other debris items capable of entangling seals or turtles were inventoried and destroyed, following the methods described in Johanos and Kam (1986).

## **RESULTS AND DISCUSSION**

### **Monk seals**

#### **Census data**

Fourteen atoll beach counts of seals, excluding pups, ranged from 34 to 62 animals ( $\bar{x} = 49.3$ ; Table 1), and counts including pups ranged from 48 to 77 ( $\bar{x} = 62.7$ ). Separate island censuses are documented in Appendix B.

## Reproduction

Of 21 pups recorded in 1988, 18 were tagged (12 male, 6 female; Table 2). Three pups of unknown sex on North Island were still nursing when research ended, and were not tagged.

## Interatoll Movement

One seal moved from Pearl and Hermes Reef in 1988. Subadult male BK29 was last sighted at Pearl and Hermes Reef on 14 August 1987, and was seen at Midway in February 1988.

## Injuries

Of 9 injuries observed on monk seals at Pearl and Hermes Reef (Table 3), 5 were due to cookie cutter sharks (Isistius brasiliensis), 3 were attributed to entanglement in debris or contact with coral reefs, and 1 was inflicted during a joust between male seals.

## Green Turtles

Seventy-six turtles (27 adults, Table 4; 49 immatures, Table 5) were tagged in 1988. Ten turtles tagged in previous years were resighted (Table 6). One wounded turtle, injured by a shark, and six turtle nests were observed on Southeast Island.

## Samples collected

Debris items catalogued and destroyed totaled 260.

## ACKNOWLEDGMENTS

We thank the captain, officers, and crew of the NOAA vessel Townsend Cromwell, and the captain and crew of the F/V Feresu for their logistical support. We also acknowledge the support of the U.S. Fish and Wildlife Service Hawaiian Islands National Wildlife Refuge staff.

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Table 1.--Summary of atoll beach counts of Hawaiian monk seals at Pearl and Hermes Reef, 1988 (M = male, F = female, and U = unknown).

Date <sup>a</sup>	Adult			Subadult			Juvenile			Pup			Total		
	M	F	U	M	F	U	M	F	U	M	F	U	Nonpup	Pup	Combined
5/20	8	12	2	10	7	0	4	1	0	3	0	5	44	8	52
5/23	8	12	1	13	7	2	3	1	2	5	0	5	49	10	59
5/29	7	14	4	11	8	3	6	6	1	5	1	7	60	13	73
6/01	9	15	3	10	6	4	5	5	0	8	0	8	57	16	73
6/06 <sup>b</sup>	10	14	5	12	9	3	6	2	1	6	0	8	62	14	74
6/08 <sup>b</sup>	9	14	4	11	10	2	6	2	1	10	0	8	59	18	77
6/10	9	14	3	10	11	1	2	3	0	4	0	9	53	13	66
6/13	6	9	6	9	11	3	4	0	0	5	2	6	48	13	61
6/16	7	11	4	12	13	0	6	2	1	9	3	4	56	16	72
6/19	7	8	5	8	12	2	3	0	0	6	2	6	45	14	59
6/22 <sup>b</sup>	3	7	1	7	6	4	6	0	0	8	3	3	34	14	48
6/24	11	12	1	7	7	1	4	0	0	9	3	3	43	15	58
6/27 <sup>b</sup>	7	9	0	7	10	1	1	2	1	6	1	4	38	11	49
6/29	8	8	4	6	7	5	3	1	0	6	5	2	42	13	55

<sup>a</sup>Date refers to day 1 of 2-day atoll counts.

<sup>b</sup>One-day atoll count.

Table 2.--Summary of Hawaiian monk seal pups tagged at Pearl and Hermes Reef, 1988.

ID No.	Tag No. <sup>a</sup>		Sex <sup>b</sup>	Tagging date	Measurement <sup>c</sup> (cm)		Island
	L	R			AG	SL	
BF10	F10	F11	M	5/18	110	137	North
BF12	F12	F13	M	5/18	106	127	North
BF14	F14	F15	M	5/18	113	137	North
BF16	F16	F17	M	5/19	103	129	Seal-Kittery
BF18	F18	F19	M	5/19	91	128	Seal-Kittery
BF20	F20	F21	M	5/20	119	138	North
BF22	F22	F23	M	5/20	109	131	North
BF24	F24	F25	M	5/26	92	124	North
BF26	F26	F28	F	5/30	--	134	North
BF30	F30	F31	M	5/31	109	133	North
BF32	F32	F33	M	6/01	104	138	Seal-Kittery
BF34	F34	F35	M	6/02	73	122	North
BF36	F36	F37	F	6/10	99	129	North
BF38	F38	F39	M	6/17	110	139	North
BF40	F40	F41	F	6/20	105	132	North
BF42	F42	F43	F	6/22	111	142	North
BF44	F44	F45	F	6/29	--	132	Seal-Kittery
BF46	F46	F47	F	6/30	114	142	North

<sup>a</sup>L = left hind flipper; R = right hind flipper.<sup>b</sup>M = male; F = female.<sup>c</sup>AG = axillary girth; SL = straight length.

Table 3.--Summary of injuries observed on Hawaiian monk seals at Pearl and Hermes Reef, 1988. (A = adult, S = subadult, and J = juvenile; M = male, F = female, and U = unknown; P = probable cause, and K = known cause).

Date	Size	Sex	ID No.	Description of injury			Cause	P or K
				Location	Type	Dimensions (cm) (l x w or diam.)		
5/18	A	F	BV39	Right lateral	Circular	3 x 3	Cookiecutter shark	P
5/20	A	U	----	Dorsal	Circular	2 x 2	Cookiecutter shark	P
5/20	S	U	----	Dorsal	Laceration	Total area covers 1/3 back	Seal	P
5/21	J	M	----	Dorsal	Abrasion	Total area covers 2/3 back	Seal	P
5/21	A	M	----	Left lateral	Laceration	10 length	Reef/debris	P
6/06	S	M	BK20	Left flipper	Laceration	7 x 2	Cookiecutter shark	P
6/08	A	M	----	Head	Circular	2 diam.	Cookiecutter shark	P
6/11	S	F	BT24	Left lateral	Circular	7 x 5	Cookiecutter shark	P
6/19	A	M	----	Left hindflipper	Gaping wound	7 x 5	Joust	K

Table 4.--Summary of adult green turtles newly tagged at Pearl and Hermes Reef, 1988.

Tag No. <sup>a</sup>		Sex <sup>b</sup>	Date tagged	Location		Carapace <sup>d</sup> measurement (cm)		
Left	Right			Island <sup>c</sup>	Sector	Status	Length	Width
4629	4630	M	5/26	SEI	5	Basking	93.0	71.0
9004		M	6/03	FR	-	Foraging	83.0	67.0
9007		M	6/06	SEI	5	Basking	88.0	64.5
9012		M	6/07	FR	-	Foraging	85.2	67.4
9020		M	6/07	SEI	5	Basking	80.0	65.0
9022		M	6/07	SEI	5	Basking	84.1	70.7
	9033	M	6/08	SEI	5	Basking	88.0	69.0
9034		M	6/08	SEI	5	Basking	90.0	69.8
9035		M	6/10	FR	-	Foraging	92.7	72.4
	9044	M	6/11	SEI	1	Basking	90.1	76.2
9127		M	6/16	FR	-	Foraging	85.0	66.0
9128		M	6/17	SEI	5	Basking	89.4	70.0
9129		M	6/17	SEI	5	Basking	84.8	66.4
9139		M	6/24	SEI	5	Basking	89.2	70.0
9140		M	6/25	SEI	5	Basking	89.9	72.1
9141		M	6/26	SEI	5	Basking	85.3	67.2
9142		M	6/26	SEI	5	Basking	86.5	64.8
9148		M	6/29	SEI	5	Basking	97.9	75.2
9150		M	6/29	SEI	5	Basking	86.9	71.9
9149		F	6/29	SEI	5	Basking	82.0	69.8
	4632	F	5/26	SEI	5	Basking	84.5	71.5
4633		F	5/30	SEI	5	Basking	84.5	68.0
	4634	F	5/30	SEI	5	Basking	81.5	67.5
4643	4644	F	6/02	FR	-	Foraging	88.5c	82.7c
9045		F	6/11	SEI	5	Basking	98.1	74.4
	9130	F	6/17	SEI	5	Basking	88.1	70.2
	9132	F	6/23	SEI	5	Basking	83.2	67.2

<sup>a</sup>Left = Left foreflipper; Right = Right foreflipper.<sup>b</sup>M = male; F = female.<sup>c</sup>SEI = Southeast Island; FR = Fringing reef.<sup>d</sup>All measurements are straight unless specified curved with a "c".

Table 5.--Summary of immature green turtles newly tagged at Pearl and Hermes Reef, 1988.

Tag No. <sup>a</sup>		Date tagged	Location		Status	Carapace <sup>c</sup> measurement (cm)	
Left	Right		Island <sup>b</sup>	Sector		Length	Width
4637	4638	6/02	FR	-	Foraging	61.0c	57.0c
4639	4640	6/02	FR	-	Foraging	40.0c	39.5c
4641	4642	6/02	FR	-	Foraging	67.0	54.0
4645	4646	6/03	FR	-	Foraging	49.0	41.0
4649	4650	6/03	FR	-	Foraging	71.0	58.0
9001		6/03	FR	-	Foraging	41.0	34.8
9002		6/03	FR	-	Foraging	50.8	41.0
9003		6/03	FR	-	Foraging	55.6	45.8
9005		6/03	FR	-	Foraging	43.4	37.0
	9006	6/03	FR	-	Foraging	39.4	32.7
	9008	6/07	IPR	-	Foraging	62.0	40.4
9009		6/07	FR	-	Foraging	45.5	39.0
9010		6/07	FR	-	Foraging	65.3	53.8
9011		6/07	FR	-	Foraging	32.0	32.0
9013		6/07	FR	-	Foraging	42.3	34.3
9014		6/07	FR	-	Foraging	45.4	39.0
9015		6/07	FR	-	Foraging	50.7	42.0
9016		6/07	FR	-	Foraging	39.8	32.0
9018		6/07	FR	-	Foraging	54.0	42.7
9019		6/07	FR	-	Foraging	41.8	35.5
9021		6/07	SEI	5	Basking	78.2	64.5
9023		6/08	FR	-	Foraging	38.6	32.8
9036		6/10	FR	-	Foraging	46.0	37.7
9037		6/10	FR	-	Foraging	46.8	39.7
9038		6/10	FR	-	Foraging	47.7	37.4
9039		6/10	FR	-	Foraging	45.6	36.3
9040		6/10	FR	-	Foraging	52.8	41.2
9041		6/10	FR	-	Foraging	42.7	36.2
9042		6/10	FR	-	Foraging	42.5	35.6
9043		6/10	FR	-	Foraging	45.3	37.7
9046		6/14	FR	-	Foraging	49.7	39.9
9047		6/14	FR	-	Foraging	53.0	44.0
9048		6/14	IPR	-	Foraging	44.0	35.0
9049		6/14	IPR	-	Foraging	41.2	41.6
9050		6/14	IPR	-	Foraging	42.2	34.3
9126		6/14	IPR	-	Foraging	50.9	38.3
9017		6/20	FR	-	Foraging	47.2	38.7
9131		6/20	FR	-	Foraging	48.9	39.5
9134		6/24	FR	-	Foraging	60.8	50.8
9135		6/24	LNI	1	Basking	69.0	56.0
9136		6/24	LNI	1	Basking	70.8	57.3
9137		6/24	IPR	-	Foraging	44.9	34.8
9138		6/24	SEI	5	Basking	64.9	52.2
9143		6/26	SEI	5	Basking	47.9	39.2
9144		6/27	FR	-	Foraging	43.3	35.2
9145		6/27	IPR	-	Foraging	43.1	34.9
9146		6/27	IPR	-	Foraging	44.0	36.5
9147		6/27	SEI	5	Basking	77.4	66.8
4628		6/28	SEI	5	Basking	69.7	58.5

<sup>a</sup>Left = Left foreflipper; Right = Right foreflipper.

<sup>b</sup>IPR = Interior patch reef; FR = Fringing reef; LNI = Little North Island; SEI = Southeast Island.

<sup>c</sup>All measurements are straight unless specified curved with a "c".

Table 6.--Summary of green turtle tag recoveries at Pearl and Hermes Reef, 1988.

Tag No. <sup>a</sup>				Resighting		Original Tagging		Status	Carapace <sup>e</sup> measurement (cm)	
Left	Right	Size <sup>b</sup>	Sex <sup>c</sup>	Date	Location <sup>d</sup>	Date	Location <sup>d</sup>		Length	Width
(4631)	8969	A	F	5/26	SEI	8/23/86	SEI	Basking	82.0	66.0
	8354	A	F	6/02	FR	7/29/84	NI	Foraging	83.2	66.0
5547	5567	A	M	5/30	SEI	9/20/66	SEI	Basking	90.0	74.0
(4636)	930	A	M	6/02	FR	12/14/70	NI	Foraging	91.5c	74.0c
	7022	A	M	6/07	SEI	6/01/83	SEI	Basking	81.3	62.0
	5544	A	F	6/08	SEI	8/07/81	SEI	Basking	84.2	68.0
8275	8276	I	U	5/30	LNI	7/12/84	LNI	Basking	--	--
5571	5570	I	U	5/30	FR	5/24/83	NI	Foraging	55.0c	49.7c
	7016	(same animal as above line; two tags on right)								
7094	7093	I	U	6/14	IPR	6/30/83	IPR	Foraging	43.5	33.0
7097	7095	I	U	6/27	IPR	6/30/83	IPR	Foraging	41.1	33.0

<sup>a</sup>Left = Left foreflipper; Right = Right foreflipper; () indicates new tag applied.

<sup>b</sup>A = adult; I = immature.

<sup>c</sup>M = male; F = female; U = unknown.

<sup>d</sup>IPR = Interior Patch Reef; FR = Fringing reef; LNI = Little North Island; NI = North Island; SEI = Southeast Island.

<sup>e</sup>All measurements are straight unless specified curved with a "c".

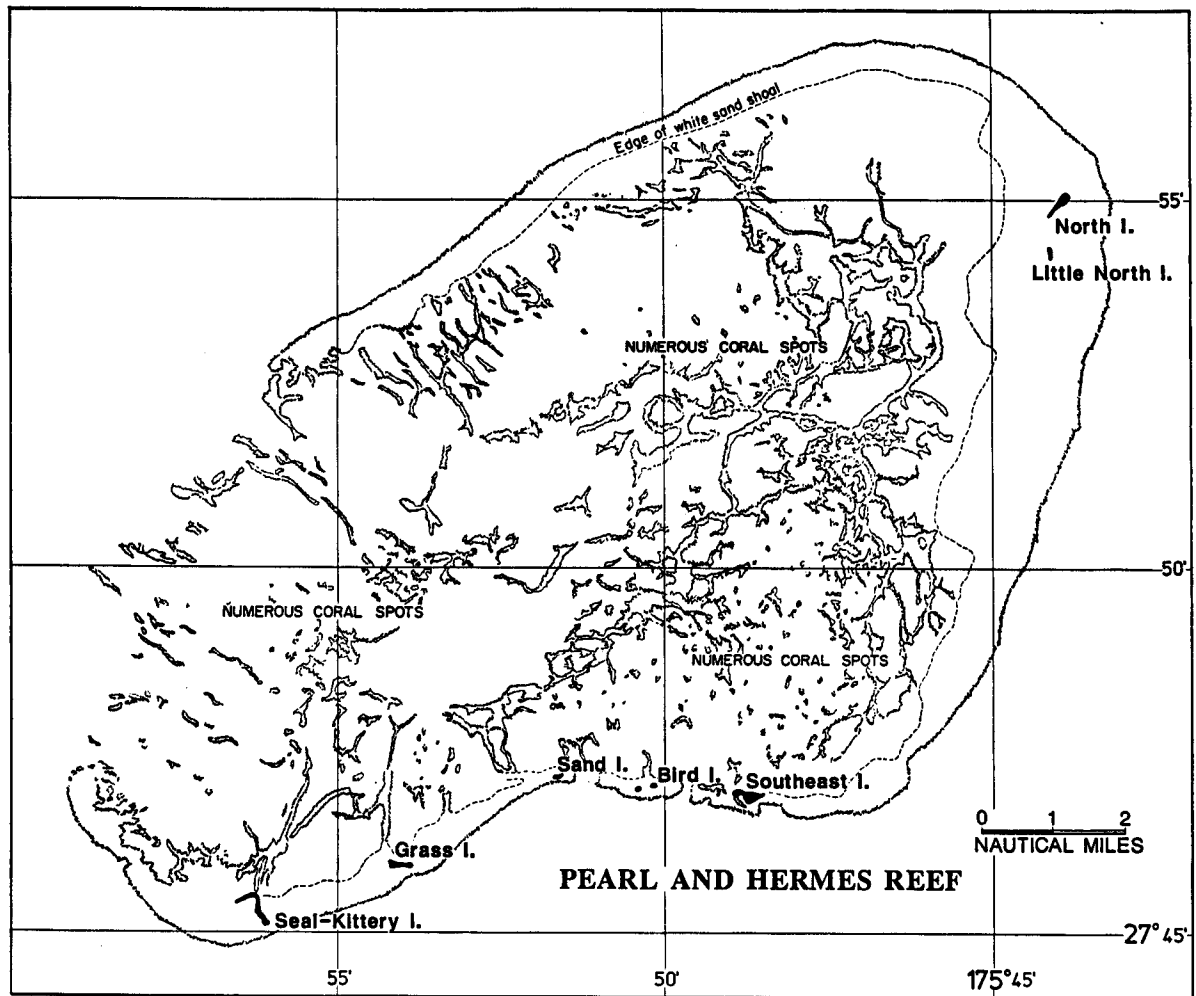


Figure 1. Pearl and Hermes Reef, Northwestern Hawaiian Islands.

## **APPENDIXES**



## Appendix A.--Itinerary for the 1988 Pearl and Hermes field season.

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Date	Event
<hr/>	
5/17	<i>Townsend Cromwell</i> arrives at Pearl and Hermes Reef and disembarks Barry K. Choy and Lisa M. Hiruki on Southeast Island.
5/18	Research begins; patrols at North and Little North Islands conducted.
5/20	Atoll census data collection begins.
7/01	The F/V <i>Feres</i> arrives at Pearl and Hermes Reef, and disembarks U.S. Fish and Wildlife Service (USFWS) personnel D. Herbst, D. K. McDermond, C. M. Rowland, and W. Takeuchi on Southeast Island.
7/02	Last census completed.
7/03	Choy, Hiruki and USFWS personnel depart Pearl and Hermes Reef on the <i>Feres</i> .

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APPENDIX B.--Summary of island censuses of Hawaiian monk seals by size class and island at Pearl and Hermes Reef, 1988. (M = male, F = female, and U = unknown).

Date	Adults			Subadults			Juveniles			Pups			Totals		
	M	F	U	M	F	U	M	F	U	M	F	U	Non-pup	Pup	Grand
Bird Island															
5/21	2	2	0	2	1	0	0	0	0	0	0	0	7	0	7
5/23	1	1	0	0	1	0	0	0	0	0	0	0	3	0	3
5/29	2	0	0	0	1	1	0	1	0	0	0	0	5	0	5
6/1	0	1	0	0	0	0	0	1	0	0	0	0	2	0	2
6/6	0	0	0	1	1	0	0	0	1	0	0	0	3	0	3
6/8	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1
6/11	1	0	0	0	0	0	0	1	0	0	0	0	2	0	2
6/13	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1
6/16	0	0	0	2	1	0	0	0	0	0	0	0	3	0	3
6/19	1	0	0	0	1	0	0	0	0	0	0	0	2	0	2
6/22	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1
6/25	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1
6/27	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1
6/29	1	1	0	1	1	1	0	0	0	0	0	0	5	0	5
Grass Island															
5/21	1	1	1	0	0	0	0	0	0	0	0	0	3	0	3
5/23	1	1	0	1	0	0	0	0	0	0	0	0	3	0	3
5/27	1	1	0	0	1	1	0	0	0	0	0	0	4	0	4
5/29	1	0	1	0	0	1	0	0	0	0	0	0	3	0	3
6/1	0	1	1	2	0	0	0	0	0	0	0	0	4	0	4
6/6	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
6/8	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
6/11	0	0	0	0	1	1	0	0	0	0	0	0	2	0	2
6/13	1	0	1	0	1	0	0	0	0	0	0	0	3	0	3
6/16	1	2	1	0	0	0	0	1	0	0	0	0	5	0	5
6/19	1	0	0	0	1	0	0	0	0	0	0	0	2	0	2
6/22	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
6/25	2	2	0	0	0	0	0	0	0	0	0	0	4	0	4
6/27	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
6/29	1	0	1	0	0	0	0	0	0	0	0	0	2	0	2

## Appendix B.--Continued.

Date	Adults			Subadults			Juveniles			Pups			Totals		
	M	F	U	M	F	U	M	F	U	M	F	U	Non-pup	Pup	Grand
Little North Island															
5/20	0	0	0	1	3	0	4	0	0	0	0	0	8	0	8
5/24	0	0	0	3	2	2	2	0	0	0	0	0	9	0	9
5/26	0	0	0	0	1	2	0	2	0	0	0	0	5	0	5
5/30	0	0	3	3	1	0	4	3	1	0	0	0	15	0	15
6/2	2	1	0	2	2	2	1	1	0	1	0	0	11	1	12
6/6	1	1	1	4	2	0	1	1	0	0	0	0	11	0	11
6/8	0	1	0	2	1	1	3	1	0	0	0	0	9	0	9
6/10	0	2	0	3	2	0	0	2	0	0	0	0	9	0	9
6/14	0	0	0	1	1	1	1	0	0	0	0	0	4	0	4
6/17	0	0	1	2	3	0	0	0	0	0	0	0	6	0	6
6/20	0	0	0	0	1	1	0	0	0	0	0	0	2	0	2
6/22	0	0	0	0	1	1	3	0	0	0	0	0	5	0	5
6/24	0	1	0	1	1	0	1	0	0	0	0	0	4	0	4
6/27	1	1	0	1	3	1	0	1	0	0	0	1	8	1	9
6/30	0	1	0	1	1	2	1	0	0	0	1	0	6	1	7
7/2	0	2	0	2	1	0	0	1	0	0	0	1	6	1	7
North Island															
5/20	1	6	0	0	0	0	0	0	0	1	0	4	7	5	12
5/24	0	9	1	4	1	0	0	0	1	3	0	4	16	7	23
5/26	1	2	0	3	2	0	0	0	0	4	0	1	8	5	13
5/30	1	10	0	4	1	0	0	0	0	4	1	6	16	11	27
6/2	0	9	1	1	0	0	1	2	0	4	0	8	14	12	26
6/6	3	9	0	3	1	0	2	0	0	5	0	8	18	13	31
6/8	2	12	2	2	1	0	1	0	0	8	0	8	20	16	36
6/10	1	8	1	1	1	0	0	0	0	2	0	9	12	11	23
6/14	0	7	1	1	0	0	0	0	0	3	2	6	9	11	20
6/17	0	7	0	1	0	0	2	1	0	6	3	4	11	13	24
6/20	1	6	0	1	3	0	0	0	0	4	2	6	11	12	23
6/22	0	5	0	0	1	1	0	0	0	5	3	3	7	11	18
6/24	0	5	0	2	1	0	0	0	0	6	2	3	8	11	19
6/27	0	4	0	1	1	0	0	0	0	3	1	3	6	7	13
6/30	0	3	1	0	1	1	0	0	0	4	3	2	6	9	15
7/2	1	3	0	1	0	0	0	0	0	4	3	1	5	8	13

## Appendix B.--Continued.

Date	Adults			Subadults			Juveniles			Pups			Totals		
	M	F	U	M	F	U	M	F	U	M	F	U	Non-pup	Pup	Grand
<b>Sand Island</b>															
5/21	1	0	0	3	1	0	0	1	0	0	0	0	6	0	6
5/23	1	0	0	0	1	0	1	0	1	0	0	0	4	0	4
5/29	0	0	0	1	1	1	0	1	0	0	0	0	4	0	4
6/1	2	0	0	1	0	1	0	0	0	0	0	0	4	0	4
6/6	1	0	0	3	0	2	0	1	0	0	0	0	7	0	7
6/8	1	0	0	0	2	1	0	1	0	0	0	0	5	0	5
6/11	0	1	0	0	2	0	0	0	0	0	0	0	3	0	3
6/13	2	0	0	1	1	0	0	0	0	0	0	0	4	0	4
6/16	2	0	0	2	1	0	1	0	0	0	0	0	6	0	6
6/19	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
6/22	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1
6/25	0	0	0	1	2	1	0	0	0	0	0	0	4	0	4
6/27	1	0	0	0	1	0	1	0	0	0	0	0	3	0	3
6/29	2	0	0	1	1	0	0	1	0	0	0	0	5	0	5
<b>Seal-Kittery Island</b>															
5/21	1	2	0	3	1	0	0	0	0	2	0	1	7	3	10
5/23	4	1	0	3	1	0	0	1	0	2	0	1	10	3	13
5/27	1	0	0	2	1	0	0	0	0	2	0	0	4	2	6
5/29	2	2	0	1	2	0	1	1	0	1	0	1	9	2	11
6/1	2	0	0	2	2	0	2	0	0	3	0	0	8	3	11
6/6	2	2	2	0	3	0	2	0	0	2	0	0	11	2	13
6/8	2	0	0	3	3	0	2	0	0	2	0	0	10	2	12
6/11	3	1	2	1	2	0	1	0	0	2	0	0	10	2	12
6/13	1	1	4	2	1	0	1	0	0	2	0	0	10	2	12
6/16	4	0	0	2	3	0	1	0	0	3	0	0	10	3	13
6/19	2	0	0	3	4	0	2	0	0	2	0	0	11	2	13
6/22	1	1	0	3	2	1	2	0	0	3	0	0	10	3	13
6/25	4	2	1	1	1	0	2	0	0	3	1	0	11	4	15
6/27	2	2	0	1	3	0	0	0	1	3	0	0	9	3	12
6/29	1	2	2	1	2	1	2	0	0	2	1	0	11	3	14

## Appendix B. - Continued.

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